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10/663,673	09/17/2003	Hiroya Kirimura	TGW-0202	2468

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ART UNIT	PAPER NUMBER
1763	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/663,673	KIRIMURA ET AL.
	Examiner	Art Unit
	Maureen G. Arancibia	1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 March 2007.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,4 and 16-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,4 and 16-23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 1, 4, and 16-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Specifically, independent Claims 1 and 20 each recite first and second gas guide ducts and first and second gas ducts. The claims are unclear as to whether the gas guide ducts are the same as the gas ducts, particularly since as recited, the first gas guide duct appears to correspond to the second gas duct, and the second gas guide duct appears to correspond to the first gas duct. For the purposes of the following examination on the merits, the recitations of the first and second gas guide ducts have been treated separately from the recitations of the first and second gas ducts, but appropriate correction is required. Claims 4, 16-19, and 21-23 are rejected due to their dependence on Claims 1 and 20.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 4, and 16-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,099,687 to Yamazaki in view of U.S. Patent 5,006,192 to Deguchi, U.S. Patent 6,302,964 to Umotoy et al., U.S. Patent 5,422,139 to Fischer, and U.S. Patent 6,148,761 to Majewski et al.

In regards to Claims 1 and 20, Yamazaki teaches a plasma processing apparatus (Figures 2 and 3), comprising a vacuum chamber 110 with an exhausting device 130; a supporting member 141 for supporting an article 180 to be processed; a gas supplying device 120 opposed to the surface of article 180, with a gas supply portion 124 and gas supply holes 123 (Column 4, Lines 5-13); and a power applying device 150 including four divided electrodes 151a-151d and high frequency power sources 152a-152d individually connected to each of the divided electrodes. The gas supply member is not connected to the power sources 152a-152d (Figure 3). The exhausting device 130 discharges gas from the periphery of the supporting member 141, which is a region in the vicinity of the periphery portion of the gas supply member (i.e. the periphery of the chamber 110), *as broadly recited in the claim.* (Column 4, Lines 14-31) The divided electrodes 151a-151d are disposed in a quadrilateral shape in a plan view surrounding the space between the article to be processed and the gas supply surface portion of the gas supply member, each divided electrode being disposed adjacent an inner surface of the vacuum container 110 such that the gas supply member, the article 180 to be processed, and the supporting member 141 are disposed internally of the quadrilateral shape. (Figure 3)

In regards to Claims 1 and 20, Yamazaki does not expressly teach that the supporting member is grounded.

Deguchi teaches that a supporting member 1a can be grounded. (Column 4, Lines 20-21; Column 6, Lines 17-19)

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by Yamazaki to have the supporting member be grounded, as taught by Deguchi. The motivation for doing so, as taught by Deguchi (Column 4, Lines 19-32), would have been to aid in the formation of a high voltage electric field in the vacuum chamber.

Further in regards to Claim 1, Yamazaki does not expressly teach that each of the divided electrodes is in the shape of a bent plate forming two electrode sections integrally connected substantially perpendicularly to each other.

Deguchi teaches electrodes 10 are each in the shape of a bent plate forming two electrode sections integrally connected substantially perpendicularly to each other (*electrodes 10 having a L-shaped cross sectional form*; Column 5, Lines 30-34; Figures 3a and 3b), as broadly recited in the claim.

It would have been obvious to one of ordinary skill in the art to modify the divided electrodes taught by Yamazaki to each have the shape of a bent plate forming two electrode sections integrally connected substantially perpendicularly to each other, as taught by Deguchi. The motivation for making such a modification, as taught by Deguchi (Column 4, Lines 15-67; Column 5, Line 30 - Column 6, Line 2), would have been to aid in the formation of plasma between the divided electrodes and the inner

walls of the vacuum chamber (*in a space 9 outside of the substrate treating discharge space 5*; Column 5, Lines 30-34), in order to perform discharge cleaning of the vacuum chamber between process runs.

In regards to Claims 1 and 20, the combination of Yamazaki and Deguchi does not expressly teach that the gas supply member has a hollow plate member having the gas supply surface portion and a cover air-tightly covering the hollow plate member opposite the gas supply surface portion, or that the hollow plate member defines a hollow internal space formed therein with a first plurality of gas supply holes formed in the gas supply surface portion in fluid communication with the hollow internal space of the hollow plate member, the cover forming an air-tight gas-receiving compartment with a second plurality of gas supply holes extending through the hollow plate member, formed in the gas supply surface portion and in fluid communication with the gas-receiving compartment but in fluid isolation from the hollow internal space of the hollow plate member such that the film-forming gas is supplied to the hollow internal space of the hollow plate member via a first gas guide duct and the film-forming gas is supplied to the gas-receiving compartment via a second gas guide duct being independent of the first gas guide duct, both the film-forming gas supplied to the hollow internal space of the hollow plate member via the first gas guide duct and the film-forming gas supplied to the gas-receiving compartment via the second gas guide duct are dispersed into the space between the article to be film-covered and the gas supply surface portion of the gas supply member opposed to the article as the film-forming gases exit respective ones of the first and second plurality of gas supply holes formed in the gas supply

surface portion independently of each other. Further in regards to Claims 4, 17-19, and 21-23, the combination of Yamazaki and Deguchi does not expressly teach that the distribution density and area of opening of the gas supply holes vary with radial distance from the center of the gas supply surface, or specifically in such a way that the amount of gas blowing from the gas supply surface portion is increased from a peripheral region to a central region, or vice versa.

Umotoy et al. teaches a gas supply member comprising a hollow plate member 1502 having a gas supply surface portion and a cover 132 air-tightly covering the hollow plate member opposite the gas supply surface portion (Figure 15; Column 4, Lines 14-22), wherein the hollow plate member defines a hollow internal space 1509 formed therein with a first plurality of gas supply holes 1520 formed in the gas supply surface portion in fluid communication with the hollow internal space of the hollow plate member (Figure 15), the cover forming an air-tight gas-receiving compartment (above upper surface 1506) with a second plurality of gas supply holes 1510 extending through the hollow plate member, formed in the gas supply surface portion and in fluid communication with the gas-receiving compartment but in fluid isolation from the hollow internal space of the hollow plate member (Column 8, Lines 55-58), such that the film-forming gas is supplied to the hollow internal space 1509 of the hollow plate member via a first gas guide duct 136 and the film-forming gas is supplied to the gas-receiving compartment via a second gas guide duct 134 being independent of the first gas guide duct, both the film-forming gas supplied to the hollow internal space of the hollow plate member via the first gas guide duct and the film-forming gas supplied to the gas-

receiving compartment via the second gas guide duct are dispersed into the space 104 between the article 106 to be film-covered and the gas supply surface portion of the gas supply member opposed to the article as the film-forming gases exit respective ones of the first and second plurality of gas supply holes formed in the gas supply surface portion independently of each other. (Column 3, Line 55 - Column 4, Line 13; Column 8, Line 6 - Column 9, Line 49; Figure 15) Umotoy et al. further teaches that the distribution density of the gas supply holes and the area of opening of the holes can vary with radial distance from the center of the gas supply surface, such that gas flow rates through the holes are correlated wit the location of the hole in the gas supply surface. (Column 4, Line 54 - Column 5, Line 5; note that as the holes have a fixed center-to-center spacing, changing the hole size would necessarily also change the distribution density of the holes)

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by the combination of Yamazaki and Deguchi to use the gas supply member as taught by Umotoy et al. The motivation for doing so, as taught by Umotoy et al. (Column 1, Line 21 - Column 2, Line 67), would have been to allow two precursor gases to be supplied to the processing space in such a way that the first time they come in contact with each other is in the processing space, thereby reacting to form a reaction product that, for example, is deposited on the surface of the substrate to be processed. This would prevent the reaction product of the two gases from being deposited on the interior of the gas supplying mechanism. (Column 1, Line 65 - Column 2, Line 3) It further would have been obvious to one of ordinary skill in the art to vary the distribution

density and area of opening of the gas supply holes with radial distance from the center of the gas supply surface, and through routine experimentation, to specifically vary these result-effective variables in such a way that the amount of gas blowing from the gas supply surface portion is increased from a peripheral region to a central region, or vice versa, in order, as taught by Umotoy et al. (Column 4, Line 54 - Column 5, Line 5), to optimize the gas flow based on the types of gases being supplied and other process conditions, such as gas flow rate, chamber pressure, and gas pressure.

The combination of Yamazaki, Deguchi, and Umotoy et al. does not expressly teach that the exhausting device discharges a gas from a region in a vicinity of a periphery portion of the gas supply member in an opposite direction to the article to be film-covered disposed on supporting member through holes of a support member for supporting the gas supply member which is provided between an inside peripheral wall of the vacuum container and the gas supply member.

Fischer teaches that an exhausting device discharges a gas from a region in a vicinity of a periphery portion of a gas supply member in an opposite direction to an article 10 to be processed disposed on a supporting member through holes 5 of a support member for supporting the gas supply member which is provided between an inside peripheral wall of the vacuum container and the gas supply member. (Figure 4; Column 8, Line 14 - Column 9, Line 15)

It would have been obvious to one of ordinary skill in the art to modify the combination of Yamazaki, Deguchi, and Umotoy et al. to have the exhausting device discharge a gas from a region in a vicinity of a periphery portion of the gas supply

member in an opposite direction to the article to be processed disposed on the supporting member through the holes of a support member for supporting the gas supply member which is provided between an inside peripheral wall of the vacuum container and the gas supply member, as taught by Fischer. The motivation for making such a modification, as taught by Fischer (Column 3, Line 18 - Column 4, Line 11; Column 8, Line 14 - Column 9, Line 15), would have been as a way of preventing "seas of not reacting or little reacting fresh reaction gas from forming, allowing the fresh gas fed to the process to be utilized to a much higher extent regarding the effectiveness of the treatment.

The combination of Yamazaki, Deguchi, Umotoy et al., and Fischer does not expressly teach wherein the gas supplying device includes a duct system that includes a hollow gas guide member, a first gas duct and a second gas duct, the hollow gas guide member extends into the vacuum container and terminates in the air-tight gas-receiving compartment, the first gas duct and the second gas duct supply the film-forming gas from a film-forming gas source to the vacuum container, the first gas duct is in fluid communication with the hollow gas guide member so that the hollow gas guide member supplies the film-forming gas to the air-tight gas-receiving compartment, the second gas duct extends through and is in fluid isolation from the hollow gas guide member and the air-tight gas-receiving compartment and terminates in the hollow internal space for supplying the film-forming gas thereto.

Majewski et al. teaches that a gas supplying device includes a duct system that includes a hollow gas guide member 182, a first gas duct 186 and a second gas duct

184, the hollow gas guide member 182 extends into the vacuum container 100 and terminates in the air-tight gas-receiving compartment 190, the first gas duct 186 and the second gas duct 184 supply the processing gas from a processing gas source to the vacuum container 100, the first gas duct 186 is in fluid communication with the hollow gas guide member 182 so that the hollow gas guide member 182 supplies the film-forming gas to the air-tight gas-receiving compartment 190, the second gas duct 184 extends through and is in fluid isolation from the hollow gas guide member 182 and the air-tight gas-receiving compartment 190 and terminates in the hollow internal space 222 for supplying the film-forming gas thereto (Figures 3 and 5; Column 6, Line 13 - Column 7, Line 5).

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by the combination of Yamazaki, Deguchi, Umotoy et al., and Fischer so that the gas supplying device includes a duct system that includes a hollow gas guide member, a first gas duct and a second gas duct, the hollow gas guide member extends into the vacuum container and terminates in the air-tight gas-receiving compartment, the first gas duct and the second gas duct supply the film-forming gas from a film-forming gas source to the vacuum container, the first gas duct is in fluid communication with the hollow gas guide member so that the hollow gas guide member supplies the film-forming gas to the air-tight gas-receiving compartment, the second gas duct extends through and is in fluid isolation from the hollow gas guide member and the air-tight gas-receiving compartment and terminates in the hollow internal space for supplying the film-forming gas thereto, as taught by Majewski et al. The motivation for making such a

modification, as taught by Majewski et al. (Column 2, Line 51 - Column 3, Line 34), would have been as an art-recognized successful and equivalent means for separately supplying the isolated first and second processing gases to a showerhead of the type taught by both Umotoy et al. and Majewski et al. It has been held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982).

Further in regards to Claims 17-19 and 21-23, Yamazaki et al. teaches that the exhausting device is capable of maintaining the gas pressure in the processing space at 6.67 to 40 Pa (50 to 300 mTorr; Column 5, Lines 26-30), which overlaps with the claimed range recited in Claims 17-19 and 21-23, and thus meets the recited limitation.

It has been held that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). In the instant case, the combination of Yamazaki, Deguchi, and Umotoy et al. teaches all of the structural limitations of the claims, and would be structurally capable of performing the intended use of forming a thin film on an article to be processed, simply by varying the process settings and type of process gas. Specifically in regards to Claims 17-19 and 21-23, the apparatus taught by the combination of Yamazaki, Deguchi, and Umotoy et al. would be structurally capable of supplying any of the claimed combinations of processing gases through the gas supply mechanism, and

due to the properties of the exhausting device taught by Yamazaki et al., would be structurally capable of maintaining the pressure within the claimed range. (See also MPEP 2114.)

In regard to Claim 16, the combination of Yamazaki, Deguchi, and Umotoy et al. just discussed does not expressly teach that the apparatus further comprises a driving device disposed at least partially in the vacuum container and connected to the supporting member, the driving device being operative to move the supporting member either towards or away from the gas supply surface portion of the gas supply member.

Umotoy et al. further teaches a driving device (the pedestal stem labeled with arrow 110 indicating vertical movement; Figure 15) disposed at least partially in the vacuum chamber and connected to a supporting member 108, the driving device being operative to move the supporting member either towards or away from the gas supply surface portion of the gas supply member. (Column 3, Line 60 - Column 4, Line 2)

It would have been obvious to one of ordinary skill in the art to further modify the apparatus taught by the combination of Yamazaki, Deguchi, and Umotoy et al. to include a driving device as taught by Umotoy et al. The motivation for doing so, as taught by Umotoy et al. (Column 3, Line 60 - Column 4, Line 2), would have been to allow the supporting member to be moved between a loading/unloading position and a process position for the substrate to be processed.

Response to Arguments

5. Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection necessitated by the amendment to the claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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